HICKORY

. . . an American wood

The true hickories—shagbark, shellbark, pignut, and mockernut—represent the major portion of commercial hickory in the United States and in the world. Hickory is strong, tough, and shock resistant, but has high shrinkage and is rather difficult to machine. The wood closely resembles that of the pecan hickories in both appearance and properties, except that true hickory is much harder. Primary uses are for furniture, tool handles, specialty items requiring exacting strength properties, flooring, plywood, fuelwood, and charcoal.

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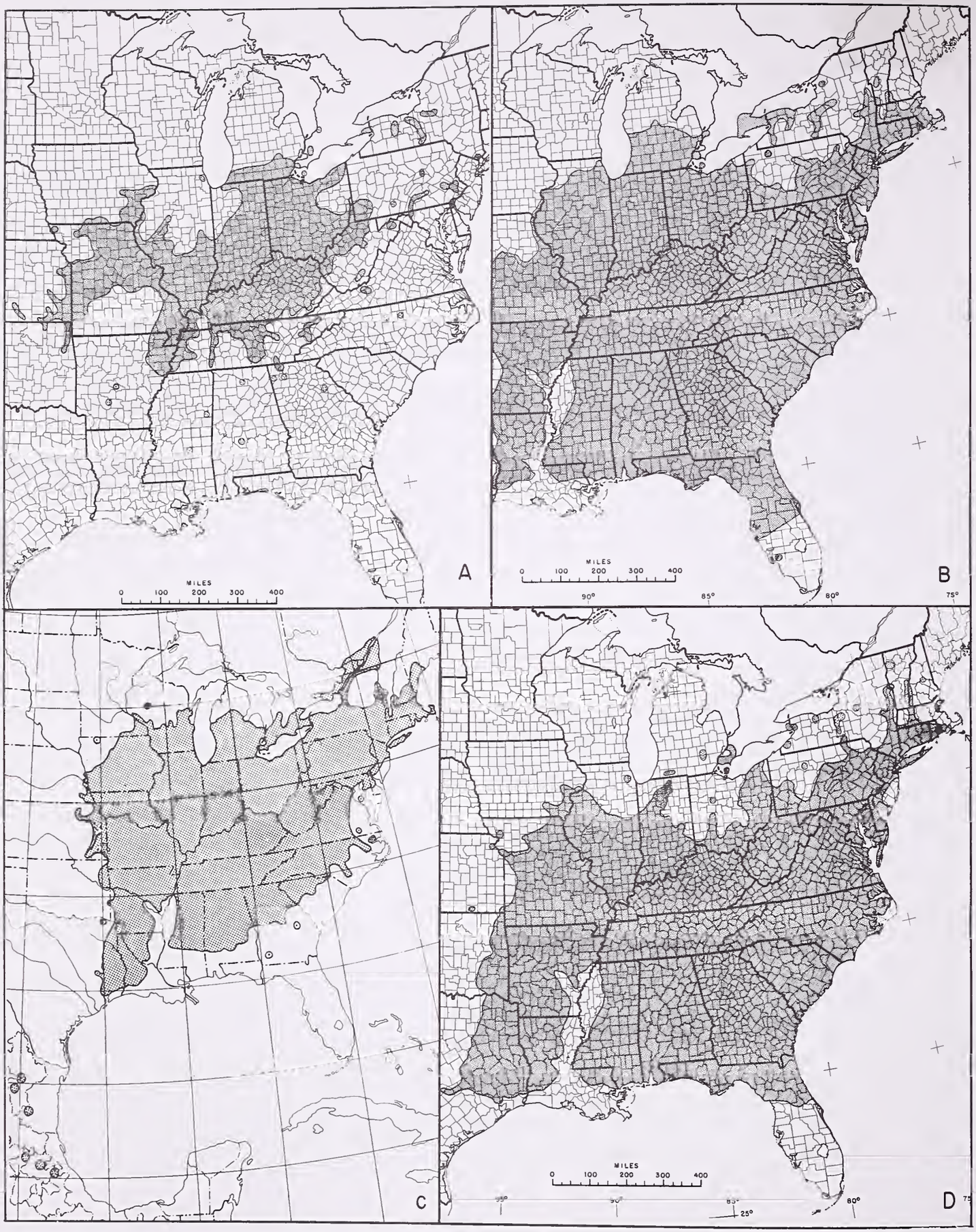

Figure 1.—Natural range of: shellbark hickory (A), pignut hickory (B), shagbark hickory (C), and mockernut hickory (D).

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A mockernut hickory in Georgia 101 feet tall and 22 inches in diameter.

HICKORY

. . . an American wood

Douglas R. Phillips[1]

DISTRIBUTION

There are in the United States 21 species of hickory, eight of which are commercially important. Of these eight commercial species, the four that are classified as true hickories—shellbark (*Carya laciniosa* (Michx. f.) Loud.), pignut (*Carya glabra* (Mill.) Sweet), shagbark (*Carya ovata* (Mill.) K. Koch), and mockernut (*Carya tomentosa* Nutt.)—are discussed in this leaflet.

The geographic range of the true hickories, as a group, extends from central Maine and Ontario south through the Eastern United States to Mexico. Hickory grows in every State east of the Mississippi River and in some States west of it. On an individual species basis, the distributions are quite similar and overlap in most cases (fig. 1).

Shellbark is not as widely distributed as the other true hickories nor is it as common. The range of shellbark extends from western New York east to Iowa and Kansas and south to Arkansas and Tennessee. It has also been found at isolated locations in some Southern States. The major concentration of the species is along the Ohio and Mississippi River Valleys from Ohio and Indiana to northeastern Arkansas (fig. 1–A).

Pignut hickory is similar to shagbark in distribution. It extends across all of the States east of the Mississippi River from New Hampshire to Louisiana. Unlike shagbark, pignut hickory extends into the coastal plains of the Southeast, although it is considered primarily an upland species (fig. 1–B).

Shagbark is the most widely distributed of the true hickories. Although it does not extend into the lower coastal plains of the Southeast, it does occur on a variety of sites at varying elevations in every State east of the Mississippi River from Maine to Louisiana. It also occurs in remote mountain areas of northeast Mexico (fig. 1–C).

Mockernut hickory ranges from New Hampshire west to Iowa, south to Texas, and east to Florida. Like the other true hickories, mockernut grows on a variety of the Eatern United States. It is generally slow-grow- but it occurs with greater frequency in the Southern States from Virginia to Louisiana (fig. 1–D).

DESCRIPTION AND GROWTH

A tree in the true hickory group is a medium-sized, deciduous hardwood that grows in the humid climate of the Eastern United States. It is generally slow-growing, but does respond favorably to increased soil fertility and has a reputation for long life. Some exceptional trees have been known to live 350 years. The true hickories vary in size by species and location, and some trees attain heights of 120 to 140 feet and diameters of 36 to 48 inches. The trees are shade-tolerant, highly competitive, and reproduce readily from both seed and sprout.

The leaves of true hickory are compound, 8 to 14 inches long, and have 5 to 9 ovate-to-obovate leaflets. The leaflets are oppositely branched and are characterized by an aromatic odor when crushed. The fruit is a round or egg-shaped nut 1 to 1¾ inches in diameter. It is covered by a hard husk, ⅛- to ¼-inch thick, which splits lengthwise along the seams of the husk. The meaty part of the nut is edible, although it is sometimes bitter (fig. 2).

The size of the seed, or nut, varies considerably between species. Shellbark has the largest seed (25 to 35 seeds per pound), pignut the smallest (approximately 200 seeds per pound). Mockernut averages 90 seeds per pound and shagbark 100 seeds per pound.

The bark of young hickory trees is characteristically smooth, gray, and very hard. As the tree grows older, the bark either breaks up into plates or forms ridges which are separated by narrow fissures. Shagbark develops plates that are wide and curled at the ends so as to give a shaggy appearance (fig. 3). Shellbark is similar to shagbark except that the plates are thinner

[1] Research forester, Southeastern Forest Experiment Station, USDA Forest Service, Forestry Sciences Laboratory, Athens, Ga.

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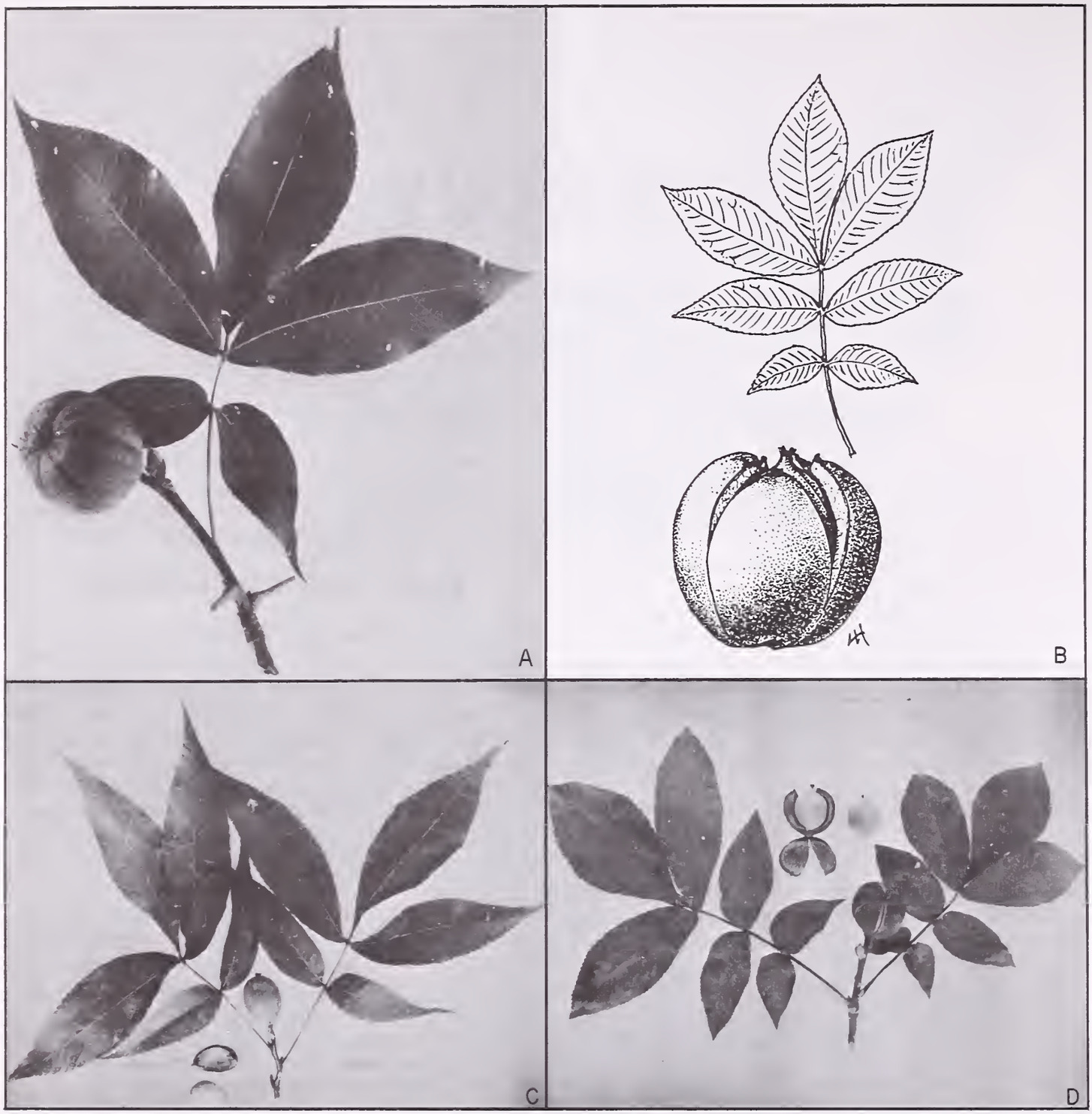

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Figure 2.—Typical leaves and nuts of the true hickories: A, shagbark hickory; B, shellbark hickory; C, pignut hickory; and D, mockernut hickory.

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Figure 3.—Shagbark hickory bark.

and more firm. Mockernut and pignut have furrowed bark with interlacing ridges. Mockernut has firm, almost horny ridges whereas pignut has somewhat scaly ridges.

Seed production varies between species, but normally the true hickories have a good seed crop once every 2 to 3 years with light seed crops in intervening years. Approximately 50 to 75 percent of all seed produced are viable. The seed-producing years are from age 25 to 200, with optimum production occurring from age 40 to 125. The rate of production is important to squirrels, chipmunks, raccoons, and other small animals since hickory nuts provide a large part of their food supply. These animals are credited with the major portion of seed dispersion for the species.

COMMON NAMES

The four species of true hickory have many common names, some of which are highly localized and will not be mentioned here.

The accepted common name for *Carya ovata* is shagbark hickory. Other names frequently used are hickory and Carolina hickory.

Shellbark hickory is the common name for *Carya laciniosa*. Other names of importance are big-leaf shagbark and kingnut.

The most widely used common name for *Carya glabra* is pignut hickory, although it is often called oval pignut.

Carya tomentosa is commonly known as mockernut hickory. Another name of less importance is bullnut.

RELATED COMMERCIAL SPECIES

The true hickories and the pecan hickories are similar in habitat, distribution, and wood characteristics. In timber inventories and timber volume reports, the distinction between true and pecan hickories is usually made. The four commercial species of true hickory represent the greater part of the volume of hickory in the United States.

The lumber production of hickory is hard to categorize by species groups. In the lumber industry, true and pecan hickories are mixed and sold under each other's group name. In fact, once the wood is processed into lumber, it cannot be distinguished by species, based on physical appearance alone. A distinction can be made by observing the anatomical structure under low magnification, but this is not a common practice in the lumber industry. Recent lumber-production surveys have recognized this situation and have reported only the combined production of hickory and pecan. Based on the volume of available growing stock, one is led to believe that most hickory lumber produced is from true-hickory species. At any rate, the lumber production of one group cannot be considered without considering the other.

SUPPLY

In 1963 the total supply of hickory (pecan and true hickories combined) was placed at 28.5 billion board feet of sawtimber or 11 billion cubic feet of growing stock. Five regions—the Middle Atlantic, Central, South Atlantic, Central Gulf, and West Gulf—contain 92 percent of the volume. In these areas hickory makes up 6 to 10 percent of the total growing stock of hardwood timber.

The most abundant supply of hickory is in Kentucky, West Virginia, and Louisiana. These States contain 30 percent of the total sawtimber supply. Seven other States—Alabama, Arkansas, Tennessee, Georgia, North Carolina, Virginia, and Ohio—contain 12.5 billion board feet or approximately 45 percent of the total supply. Thus, 75 percent of the hickory sawtimber volume in the United States is concentrated in 10 States.

PRODUCTION

The production of hickory lumber has fluctuated considerably since the early 1900's (fig. 4). In 1909 an alltime high of 334 million board feet was produced. After this date, production declined sharply for the next few years and continued to decline until 1932, when production reached an alltime low of 6 million board feet. After 1932 lumber production again increased and

peaked at 120 million board feet during the war years of the 1940's. Production declined after the war, but in 1948 the trend was again reversed and production has increased ever since. In 1965 lumber production was placed at 145 million board feet.

A large quantity of hickory roundwood is processed without being converted into lumber. Thus, lumber production figures do not present the full picture. In the years before 1948 it was estimated that approximately 35 percent of all hickory processed was marketed in the form of bolts. In 1948, the first year that figures were available, hickory-bolt production was estimated at 39.1 million board feet or approximately 45 percent of the total volume produced. Bolt production was up to 62.3 million board feet in 1960, but represented only 35 percent of the total volume produced that year. In 1965 production stayed constant at 62.9 million board feet, but the percentage of total production decreased to 30 percent because of increased lumber production.

CHARACTERISTICS AND PROPERTIES

The wood of the true hickories is known for its strength. Some woods are stronger than hickory and others are harder, but no other commercial species of wood is equal to it in combined strength, toughness, hardness, and stiffness. As a basis of comparison, hickory is approximately 30 percent stronger than white oak and 100 percent more shock-resistant.

In cross-section the growth rings of hickory are very distinct, as are the heartwood and the sapwood. The heartwood is pale brown to reddish brown, the sapwood is white and approximately 2 to 4 inches wide in a tree 12 inches in diameter. The wood is straight-grained but has a coarse, nonuniform texture.

Because hickory is a high-density wood with a specific gravity of approximately 0.64, it shrinks a great deal during drying. This excessive shrinkage often results in checking, warping, and other seasoning defects.

Because of its hardness and high shrinkage factor, hickory is classified as a difficult wood to machine and glue. Hickory is also considered a difficult wood to pressure-treat with preservatives.

The nail-holding ability of hickory is good, although there is a tendency for the wood to split when nailed. To reduce this problem, it is suggested that slender, blunt-pointed, low-carbon nails be used.

Birdpeck is often a degrading effect in hickory. Specifications for firsts, seconds, and No. 1 common lumber grades show that birdpecks less than $\frac{3}{8}$-inch in diameter are allowed, unless their combined area equals $\frac{1}{12}$ of the total area required for clearcuttings. In cases where birdpeck is serious enough to degrade a piece of lumber, it reduces it by only one grade. The damage from birdpeck is not to the structure of the wood, but to its appearance. Holes made through the bark by sapsuckers cause a discoloration of the wood which results in the rejection of a considerable amount of lumber.

Over the years a prejudice has developed against the heartwood of hickory. Red hickory (heartwood) is often placed in a lower grade than white hickory (sapwood) simply because of its color. Tests by the Forest Products Laboratory have shown conclusively that red, white, and mixed red-and-white hickory have the same strength characteristics, regardless of color. The negative attitude toward red hickory developed during the days of virgin hickory stands. Under virgin-stand conditions the heartwood was often less dense and not as strong as the sapwood. In the second-growth stands of today this density difference does not exist, and specifications and utilization practices should be adjusted to take this fact into account.

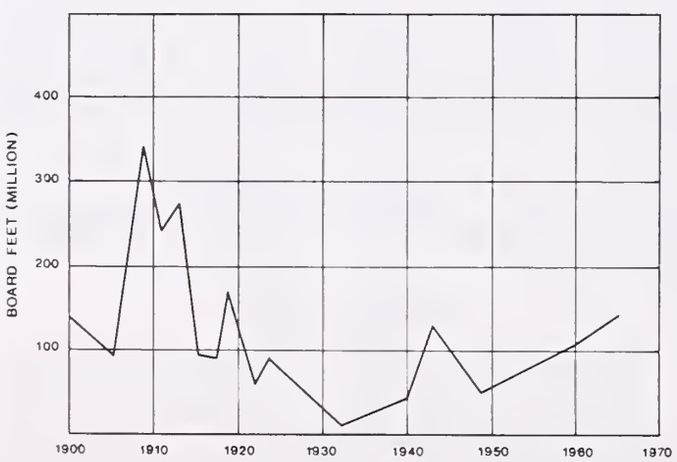

Figure 4.—Lumber production of true hickory (shagbark, shellbark, pignut, mockernut), 1905–1965. Note: Production figures for the period 1948–1965 include an undetermined amount of pecan hickory.

PRINCIPAL USES

Probably the single most important use of hickory has been in the toolhandle industry. In 1940 it was estimated that 80 percent of all hickory used in manufacturing industries in the United States went into handles. Today the major use of hickory is in the production of furniture. In 1965 approximately 40 percent of all hickory used in manufacturing industries went into furniture, and only about 8 percent went into tool handles.

The combined strength, hardness, and shock resistance of hickory wood make it especially suitable for many specialty items. Hickory is used for such industrial products as picker sticks, ladder rungs, and dowels. In the sporting-goods industry it is used for skis, archery equipment, and baseball bats. Other specialty items include parts for musical instruments and veneer for street brooms.

Hickory is used to a limited extent in a variety of other products which include flooring, veneer and plywood, railroad crossties, fuelwood, and charcoal. Hardwood flooring seems to be the most dominant of these. In 1965, 16 percent of all hickory used went into flooring, an increase of 8 percent in a period of 17 years. Hickory veneer has been produced on a small scale for use in paneling, specialty items, and a small amount of plywood. The major drawback in producing a large quantity of veneer appears to be the lack of veneer-quality logs. The tendency of hickory to check during drying and the difficulty of treating it with a preservative have prevented greater use of hickory in the production of crossties. Hickory is very popular as a fuelwood and as a charcoal-producing wood. The fuelwood burns evenly and produces long-lasting, steady heat; the charcoal gives food a hickory-smoked flavor.

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